

Appl. No. 10/816,402

Amended December 23rd, 2005

Reply to Office Action of 26 Nov 2005

REMARKS-General

Amendments

The applicants have amended the claims so as to overcome the examiner objections and for their rejections under 35 USC §112:

Claim 7 has been amended to clarify "a feedback digital signal from said detecting device" to be "a feedback digital signal from said digital output of said detecting device".

In claim 13, the reference to reducing "noise" was changed to equivalently describe increasing "resolution and dynamic range". This terminology is clearly described in the specification [paragraphs 13, 22, and 31, for example]. The term "noise" is agreed to be ambiguous and has a variety of meanings in the art (electrical interference, thermally induced circuit noise, acoustic noise, etc), and has differing meanings in various places it is used in the specification.

Regarding the claims rejections under 35 USC §112, we remove the term "illumination" as having insufficient support in the specification, and the same reason have removed the term "temperature". The remaining terms in this list (position, velocity, acceleration, pressure) are sufficiently supported as the dynamic system properties of the mechanical motor control system described.

In compliance with 37 CFR 1.21, all the new claims directly follow from the teaching described in details throughout all the patent application specification, drawings, abstract and title. None of the amended claims introduces new elements or concepts not directly derived from the specification of the published application.

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Response to Office Action

Claims objections

As described above, claims 7 and 13 have been amended in response to the objections raised by the examiner.

Claim Rejections under 35 USC §112.

As described above, the claim 13 has been narrowed to exclude control systems other than the described electromechanical motor control described at length in the specification. (Although "illumination" and "temperature" could be controlled with a servo-loop modified with an oversampled DAC as disclosed, there was no explicit or implied mention of such systems in the specification.)

Claim Rejections under 35 USC §103.

The claims 7-12 and 13-17 were rejected under 35 U.S.C. 103 as being unpatentable over Kobayashi et al. (6,153,997) in view of Bibyk (6,202,198).

As was discussed in the telephone conversation on 22 December 2005 between the examiner and the inventors, the objection relates to whether the inclusion of a technique well-known in the field of signal processing codecs (Bibyk) into systems very clearly similar to the present inventions servo control loop (Kobayashi) would be obvious to one skilled in the art.

The following are the reasons why the applicants contend that the invention is not obvious:

1. Combination of art from different fields: Codecs versus Servo Loops are nonanalogous art.

As discussed, in the field of codecs, analog to digital and digital to analog conversions have system requirements quite different than those of servo systems. Those lead to designers in one field achieving solutions differently, and even defining the nature of common problems in differing terms that are inimical to using common approaches:

- A. Open loop versus closed loop: The field of codecs is limited to open-loop systems. These systems have defined inputs and outputs that both may be in

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the physical world as shown in fig. 1 of Bibyk, as in the example of a telephone system. But the system lacks important features that would allow it to be used as a closed-loop system as is the nature of the art of electromechanical servo systems. Closed loop systems are primarily concerned with controlling a particular output and the design of which centers around the competing issues of maintaining tight control and maintaining stability of the resulting negative feedback loop.

- B. Differing concepts of accuracy: In servo systems, the primary descriptions of DAC performance are absolute DC accuracy and settling time. In codecs, signal integrity (noise, distortion, etc) is important but latency (delay) and absolute DC accuracy are not typically critical. Although the requirements are not mutually exclusive, the way the problem of accuracy is defined leads directly to the nature of the conventional solutions in either art, and tends to preclude solutions that are conceptually modeled along different lines.
- C. Differing levels of abstraction: The complex mixed-signal nature of a codec leads to acceptance of solutions that are at levels of abstraction far removed from simple analog-digital-analog block diagram representations. Conversion of analog signals to a wide variety of digital formats, and trans-coding between those formats, suggests to those in this field that conversion between multiple representations is normal and the abstraction of digital to bitstream to analog is a minor issue of signal complexity. In servo systems, the digital representation of signals is hidden by the "black box" of the microcontroller, which occasionally outputs a digital value to a converter, and that digital value is considered to be representative of an absolute analog value. Adding a further level of abstraction, such as converting the digital value commanded by the microcontroller to an oversampled bitstream representation, is not a leap that would be seen as obvious to those skilled in the art of designing motor servo systems.

2. Unsuggested Combination

Neither cited reference suggests that such a combination would be desirable. Bibyk, though describing the driving of motors and loudspeakers at the output of the codec

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Complete listing of pending claims, as amended:

7. A motor positioning servo loop controller


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Conditional Request For Constructive Assistance

Applicants have amended the claims of this application so that they are proper, definite, and define novel structure which is also unobvious. If, for any reason this application is not believed to be in full condition for allowance, applicants respectfully

request the constructive assistance and suggestions of the Examiner pursuant to M.P.E.P. § 2173.02 and § 707.07(i) in order that the undersigned can place this application in allowable condition as soon as possible and without the need for further proceedings.

Very respectfully,


Carl Sawtoll


Paolo Menegoli

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